

## **An analysis of Dynamic Management Areas, January 2010- March 2019, in support of the US Take Reduction Team**

April 2019

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### **Introduction**

We used the Dynamic Management Area (DMA) dataset housed at the NOAA NEFSC to [generate maps](#) that are roughly analogous to analyses used to create Seasonal Area Management zones (SAMs) for fisheries management (Merrick *et al.* 2001) and Seasonal Management Areas (SMAs) for vessel speed restrictions (Merrick 2005) to protect right whales. These seasonal areas were drawn to contain areas where sightings of three or more right whales occurred over multiple years. In Merrick *et al.* (2001), only NOAA aerial survey sightings 1999-2001 were used, and SAMs were drawn around areas where sightings of three or more right whales occurred seasonally over at least two years. In Merrick (2005), survey sightings from the North Atlantic Right Whale database (NARW) 1999-2003 were used, and SMAs were drawn around areas where sightings of three or more right whales occurred seasonally over at least three years. This analysis provides the most recent 9+ years of verified sightings of three or more right whales for Take Reduction Team (TRT) members. An interactive interface is provided for members to facilitate their review of right whale distribution and potential persistence relative to fisheries management areas.

### **Dynamic Management Areas (DMAs)**

DMAs are a component of the 2008 NOAA Ship Strike Rule to minimize lethal ship strikes of North Atlantic right whales. DMAs are temporary protection zones that are triggered when three or more whales are sighted within 2-3 miles of each other outside of active Seasonal Management Areas (SMAs). The size of a DMA is larger if more whales are present. A DMA is a rectangular area centered over whale sighting locations and encompasses a 15-nautical mile buffer surrounding the sightings' core area to accommodate the whales' movements over the DMA's 15-day lifespan. The DMA lifespan is extended if three or more whales are sighted within 2-3 miles of each other within its bounds during the second week the DMA is active. Only verified sightings are used to trigger or extend DMAs. The trigger of three or more whales is taken from a NOAA NEFSC analysis of sightings data from Cape Cod Bay and Stellwagen Bank from 1980 to 1996 (Clapham & Pace 2001). This analysis found that an initial sighting of three or more right whales was a reasonably good indicator that whales would persist in the area, and the average duration of the whale's presence based on these sightings data was two weeks.

### **Analysis**

DMAs issued since January 2010 that occurred north of 36° North were used in this analysis. For the winter seasonal analysis, November and December 2009 were additionally included. An overall analysis was done that included all DMAs to show density within 1nm<sup>2</sup> grid cells of management areas issued similar to methods in Asaro (2012). Additionally, maps were compiled grouped by months as well as by seasons and included iterative, consecutive 3-year periods to compare to the methods of Merrick *et al.* (2001) and Merrick (2005). Within each year, one layer was created so that overlapping DMAs within a year were flattened so that each zone was only represented once. Shading indicates the number of consecutive years an area had overlapping DMAs by month or season.

The trigger date, defined here as the date of observed right whale sightings that triggered a DMA or DMA extension, was used for monthly/seasonal binning. Please note that instances where a DMA's 15-day lifespan went into the following month are not reflected in these maps, e.g., a DMA that is triggered by sightings on 17 February and expires on 05 March will only be included in the February map. A DMA would be reflected the following month if the extension was made in the following month, e.g., sightings on 03 March would extend the DMA example above through March 17 and would be reflected in maps within the month of March. We decided to use the trigger date, rather than the span of the DMA, because the trigger month is reflective of whale sightings, and this analysis did not aim to quantify the effectiveness of the DMA process.

For the seasonal analysis, seasons were divided in three 4-month groups as follows:

Winter = November through February

Spring (primavera) = March through June

Summer = July through October

The spring season grouping was chosen to coincide with the spring bloom (generally Feb/Mar south of the islands, April on George's and the GOM), and the summer period ending in October to coincide with fall turnover (generally October in the Mid-Atlantic).

### **Proposed Area Closures**

The following proposed area closures were included with the DMA analysis:

Georges Bank 100m - 600m: all months

Gulf of Maine 100m - EEZ: all months

Statistical Area 537: January through May 14, November, & December

Massachusetts Restricted Area: February through April

Massachusetts Restricted Area -- Northern expansion: February through May 14

Rectangle south of Nantucket: February through May

Great South Channel Restricted Area: April through June

Western Gulf of Maine: April

### **Caveats**

This analysis used DMAs rather than sighting locations as in Merrick *et al.* (2001), and therefore the results are analogous but not directly comparable. More importantly, however, DMAs are not triggered if a right whale aggregation is sighted within an active SMA. Therefore, this analysis does not assess the recurrence of right whales in the existing SMAs. The boundaries of SMAs are shown on the maps as blue polygons, and any grey shading indicates DMAs that were triggered either outside an SMA or were triggered during periods when an SMA was not active (see SMA regulations [here](#)).

### **Interpretive value**

Perhaps the most important result of this analysis is the apparent changes as well as consistency in the distribution of DMAs over the years. There are areas where right whales have been consistently sighted

that are outside of SMAs, but there has also been an increase in the persistence of right whale occupancy south of the Cape and Islands.

## **References**

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Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026.